

KAMOTO, T. et al.  
Appl. No. 10/665,088  
Atty Ref.: 1114-189  
Amendment  
September 10, 2008

**AMENDMENTS TO THE CLAIMS:**

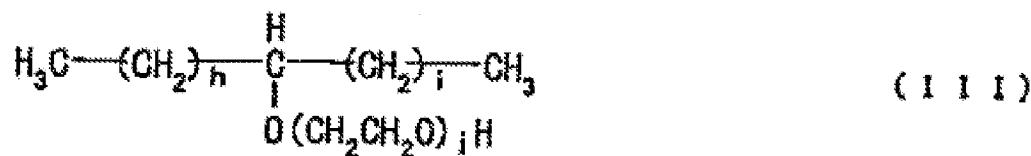
Amend the claims as follows:

Claims 1-53. (Canceled)

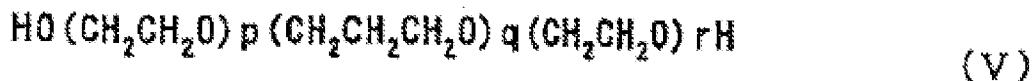
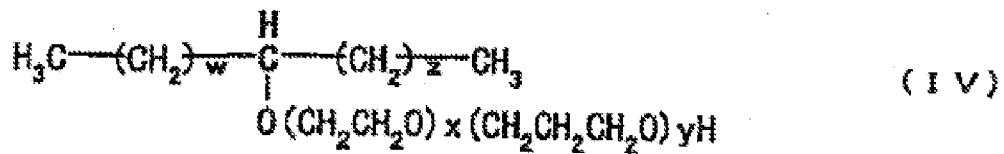
54. (Currently Amended) An ink composition comprising at least a coloring agent and a medium, wherein the ink composition has a dynamic surface tension, measured by a maximum bubble pressure method at a temperature of 24 to 26°C, and a static surface tension measured at a temperature of 24 to 26°C which satisfy the following relation (1):

$$0 \leq [\text{dynamic surface tension (mN/m)}] - [\text{static surface tension (mN/m)}] \leq 7 \\ (\text{mN/m}) \quad (1),$$

said composition further comprising a surfactant which is present at least in an amount of a critical micelle concentration, wherein ~~said coloring agent includes a dye,~~ and wherein a bubble frequency, at which the dynamic surface tension is measured, is within a range from 0.5 to 35 Hz, and wherein the surfactant is a compound represented by any one of following general formulas (III), (IV) and (V)



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wherein, in the general formula (III), h represents an integer or a fractional number from 0 to 11, i represents an integer or a fractional number from 0 to 11, j represents an integer or a fraction number from 3 to 50, and a sum of h and i (h+i) represents an integer or a fractional number from 9 to 11, in the general formula (IV), w represents an integer or a fractional number from 0 to 11, x represents an integer or a fractional number from 5 to 9, y represents an integer or a fraction number from 2.5 to 5, z represents an integer or a fractional number from 0 to 9; and a sum of w and z (w+z) represents an integer or a fractional number from 9 to 11, and in the general formula (V), p represents an integer or a fractional number from 0 to 78, q represents an integer or a fractional number from 2 to 15, and r represents an integer or a fraction number from 0 to 18.

Claim 55. (Canceled)

56. (Previously Presented) The ink composition of claim 54, wherein the static surface tension is within a range of from 20 to 50 mN/m.

57. (Previously Presented) The ink composition of claim 54, further comprising water as a medium.

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58. (Previously Presented) The ink composition of claim 54, wherein the medium includes a glycol ether and/or a polyhydric alcohol.

Claim 59. (Canceled)

60. (Previously Presented) The ink composition of claim 54, wherein the coloring agent includes a pigment.

61. (Previously Presented) The ink composition of claim 54, wherein the coloring agent includes a pigment having a hydrophilic group.

62. (Previously Presented) The ink composition of claim 54, wherein the surfactant includes a nonionic surfactant.

63. (Previously Presented) The ink composition of claim 60, wherein the pigment includes at least one of C. I. Pigment blue 15:3, C. I. Pigment blue 15:4, C. I. Pigment red 122, C. I. Pigment red 209, C. I. Pigment violet 19, C. I. Pigment yellow 74, C. I. Pigment yellow 138, C. I. Pigment yellow 150 and C. I. Pigment yellow 180.

64. (Withdrawn) A recording method for recording an image, comprising:  
depositing an ink composition on a recording material,  
wherein the ink composition is the ink composition of claim 54.

65. (Withdrawn) The recording method of claim 64 wherein, prior to said depositing, said ink composition is pressurized to discharge a liquid droplet of the ink composition; and

said depositing comprises depositing the liquid droplet on the recording material.

66. (Withdrawn) A recording method of claim 64, wherein the ink composition comprises a yellow pigment, a magenta pigment and a cyan pigment.

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67. (Withdrawn) A recording method for recording an image, comprising:

pressurizing an ink composition to discharge a liquid droplet of an ink composition; and

depositing the liquid droplet on a recording material, wherein the ink composition comprises a blue pigment, a red or violet pigment, and a yellow pigment of claim 63.

68. (Withdrawn) A recorded image recorded by the recording method of claim 64.

69. (Withdrawn) A recorded image recorded by the recording method of claim 65.

70. (Previously Presented) An ink set comprising a blue pigment, a red or violet pigment, and a yellow pigment of claim 63.

71. (Previously Presented) An ink head comprising:  
an ink tank comprising the ink composition of claim 54;  
an ink chamber having a discharge port for discharging a liquid droplet of the ink composition and receiving a supply of the ink composition from the ink tank;  
a piezoelectric element generating a strain in response to an applied voltage and provided at least in a part of the ink chamber thereby applying a pressure to the ink composition contained in the ink chamber; and  
an electrode for applying a voltage to the piezoelectric element.

72. (Previously Presented) An ink head comprising:

an ink tank comprising the ink composition of claim 54;

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an ink chamber having a discharge port for discharging a liquid droplet of the ink composition and receiving a supply of the ink composition from the ink tank;

a heat generating member provided in at least a part of the ink chamber, for heating the ink composition contained in the ink chamber to generate a bubble therein and thereby applying a pressure to the ink composition; and

an electrode for applying a voltage to the heat generating member.

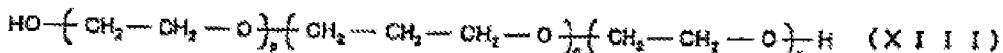
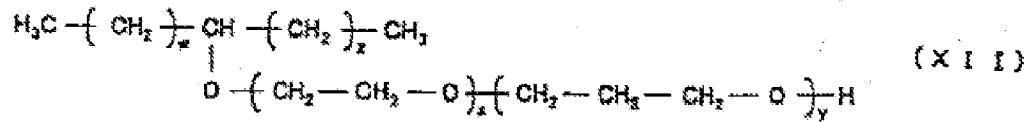
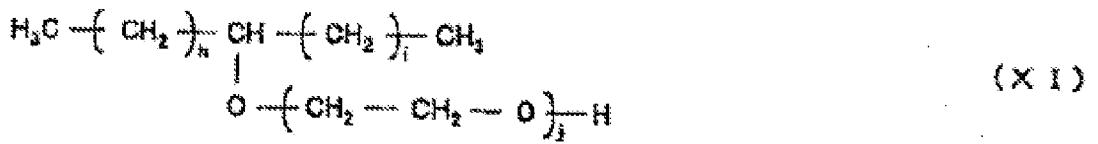
73. (Withdrawn) A recorded image recorded by depositing a liquid droplet of an ink composition, discharged by the ink head of claim 71, onto a recording material.

74. (Previously Presented) A recorded image recorded by depositing a liquid droplet of an ink composition, discharged by the ink head of claim 72, onto a recording material.

75. (Currently Amended) An ink composition comprising at least a coloring agent and a medium, wherein among dynamic surface tensions measured by a maximum bubble pressure method at a temperature of 24 to 26°C, a dynamic surface tension ( $\alpha_{10}$ ) at a bubble frequency of 10 Hz and a dynamic surface tension ( $\alpha_1$ ) at a bubble frequency of 1 Hz have a difference  $d$  ( $= \alpha_{10} - \alpha_1$ ) satisfying the following relation (2):

$$0 \text{ mN/m} \leq d \leq 7 \text{ mN/m} \quad (2),$$

said composition further comprising a surfactant which is present at least in an amount of a critical micelle concentration, ~~wherein said coloring agent includes a dye, and wherein a bubble frequency, at which the dynamic surface tension is measured, is within a range from 0.5 to 35 Hz, and wherein the surfactant is a compound represented by any one of following general formulas (XI), (XII) and (XIII)~~



wherein, in the general formula (XI), h represents an integer or a fractional number from 0 to 11, i represents an integer or a fractional number from 0 to 11, j represents an integer or a fraction number from 3 to 50, and a sum of h and i (h+i) represents an integer or a fractional number from 9 to 11, in the general formula (XII), w represents an integer or a fractional number from 0 to 11, x represents an integer or a fractional number from 5 to 9, y represents an integer or a fraction number from 2.5 to 5, z represents an integer or a fractional number from 0 to 9; and a sum of w and z (w+z) represents an integer or a fractional number from 9 to 11, and in the general formula (XIII), p represents an integer or a fractional number from 0 to 78, q represents an integer or a fractional number from 2 to 15, and r represents an integer or a fraction number from 0 to 18.

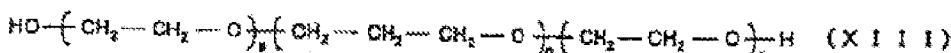
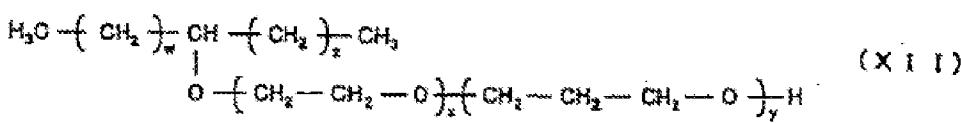
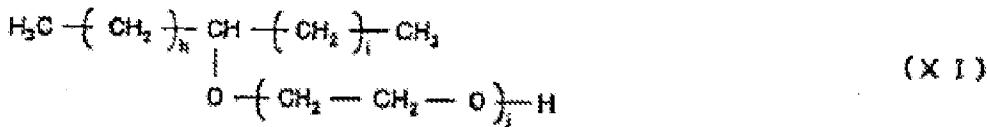
76. (Currently Amended) An ink composition comprising at least a coloring agent and a medium, wherein among dynamic surface tensions measured by a maximum bubble pressure method at a temperature of 24 to 26°C, a dynamic surface tension ( $\alpha_{10}$ )

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at a bubble frequency of 10 Hz and a dynamic surface tension ( $\alpha_1$ ) at a bubble frequency of 1 Hz have a difference d ( $= \alpha_{10} - \alpha_1$ ) satisfying the following relation (2):

$$0 \text{ mN/m} \leq d \leq 7 \text{ mN/m} \quad (2),$$

the coloring agent consists of a dye, and wherein the surfactant is a compound represented by any one of following general formulas (XI), (XII) and (XIII)



wherein, in the general formula (XI), h represents an integer or a fractional number from 0 to 11, i represents an integer or a fractional number from 0 to 11, j represents an integer or a fraction number from 3 to 50, and a sum of h and i (h+i) represents an integer or a fractional number from 9 to 11, in the general formula (XII), w represents an integer or a fractional number from 0 to 11, x represents an integer or a fractional number from 5 to 9, y represents an integer or a fraction number from 2.5 to 5, z represents an integer or a fractional number from 0 to 9; and a sum of w and z (w+z) represents an integer or a fractional number from 9 to 11, and in the general formula (XIII), p represents an integer or a fractional number from 0 to 78, q represents an

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integer or a fractional number from 2 to 15, and r represents an integer or a fraction  
number from 0 to 18.

Claim 77. (Canceled)

78. (Previously Presented) The ink composition of claim 75, wherein the static surface tension is within a range of from 20 to 50 mN/m.

79. (Previously Presented) The ink composition of claim 75, further comprising water as a medium.

80. (Previously Presented) The ink composition of claim 75, wherein the medium includes a glycol ether and/or a polyhydric alcohol.

Claim 81. (Canceled)

82. (Previously Presented) The ink composition of claim 75, wherein the coloring agent includes a pigment.

83. (Previously Presented) The ink composition of claim 75, wherein the coloring agent includes a pigment having a hydrophilic group.

84. (Previously Presented) The ink composition of claim 75, wherein the surfactant includes a nonionic surfactant.

85. (Withdrawn) The ink composition of claim 82, wherein the pigment includes at least one of C. I. Pigment blue 15:3, C. I. Pigment blue 15:4, C. I. Pigment red 122, C. I. Pigment red 209, C. I. Pigment violet 19, C. I. Pigment yellow 74, C. I. Pigment yellow 138, C. I. Pigment yellow 150 and C. I. Pigment yellow 180.

86. (Withdrawn) A recording method for recording an image, comprising:  
depositing an ink composition on a recording material,

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wherein the ink composition is the ink composition of claim 75.

87. (Withdrawn) The recording method of claim 86 wherein, prior to said depositing, said ink composition is pressurized to discharge a liquid droplet of the ink composition; and

said depositing comprises depositing the liquid droplet on the recording material.

88. (Withdrawn) A recording method of claim 86, wherein the ink composition comprises a yellow pigment, a magenta pigment and a cyan pigment.

89. (Withdrawn) A recording method for recording an image, comprising:  
pressurizing an ink composition to discharge a liquid droplet of an ink composition; and

depositing the liquid droplet on a recording material, wherein the ink composition comprises a blue pigment, a red or violet pigment, and a yellow pigment of claim 85.

90. (Withdrawn) A recorded image recorded by the recording method of claim 75.

91. (Withdrawn) A recorded image recorded by the recording method of claim 87.

92. (Previously Presented) An ink set comprising a blue pigment, a red or violet pigment, and a yellow pigment of claim 85.

93. (Previously Presented) An ink head comprising:  
an ink tank comprising the ink composition of claim 75;  
an ink chamber having a discharge port for discharging a liquid droplet of the ink composition and receiving a supply of the ink composition from the ink tank;

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a piezoelectric element generating a strain in response to an applied voltage and provided at least in a part of the ink chamber thereby applying a pressure to the ink composition contained in the ink chamber; and

an electrode for applying a voltage to the piezoelectric element.

94. (Previously Presented) An ink head comprising:

an ink tank comprising the ink composition of claim 75;

an ink chamber having a discharge port for discharging a liquid droplet of the ink composition and receiving a supply of the ink composition from the ink tank;

a heat generating member provided in at least a part of the ink chamber, for heating the ink composition contained in the ink chamber to generate a bubble therein and thereby applying a pressure to the ink composition; and

an electrode for applying a voltage to the heat generating member.

95. (Withdrawn) A recorded image recorded by depositing a liquid droplet of an ink composition, discharged by the ink head of claim 93, onto a recording material.

96. (Withdrawn) A recorded image recorded by depositing a liquid droplet of an ink composition, discharged by the ink head of claim 94, onto a recording material.